

1.2 Beams

Compressive Strength of Concrete Cores MTO Cores - Beam Cores

					No Corr. Factor			
	Dimensions				Load	Compressive		Area of core = 0.007235 m ²
Sample ID	Length	Diameter (m)	Ratio l/d	Corr. Factor	Strength			
	l (m)	d (m)			P (kN)	(MPa)		
1.1	0.151	0.096	1.573	0.97	294	40.6		
1.2	0.155	0.096	1.613	0.97	206	28.4	Mix 1	
2.1	0.152	0.096	1.583	0.97	170	23.5		
2.2	0.156	0.096	1.625	0.97	162	22.3	Mix 2	
3.1	0.153	0.096	1.594	0.97	208	28.7		
3.2	0.153	0.096	1.594	0.97	186	25.7	Mix 3	
4.1	0.150	0.096	1.563	0.97	192	26.5		
4.2	0.148	0.096	1.542	0.96	240	33.1	Mix 4	
5.1	0.156	0.096	1.625	0.97	181	25.0		
5.2	0.151	0.096	1.573	0.97	241	33.2	Mix 5	
6.2	0.156	0.096	1.620	0.97	217	30.0	Mix 6	
6R.1	0.152	0.096	1.583	0.97	244	33.7		
6R.2	0.153	0.096	1.594	0.97	173	23.9	Mix 6 with rebars	

pi = 3.14159265

A.2 Tensile Strength

Splitting Tensile Strength - ASTM C496

MTO Cores - Beam Cores

Sample ID	Dimensions		Load P (kN)	Splitting Tensile Strength T (kPa)	MPa
	Length l (m)	Diameter (m) d (m)			
1.3	0.135	0.096	93.76	4605.7	4.6
2.3	0.113	0.096	66.90	3926.1	3.9
3.3	0.144	0.096	89.72	4131.8	4.1
4.3	0.143	0.096	93.25	4324.4	4.3
5.3	0.131	0.096	58.28	2950.2	3.0
6.3	0.138	0.096	79.84	3836.6	3.8
6R.3	0.146	0.096	97.14	4412.2	4.4

Splitting Tensile Strength $T = 2P/\pi \cdot l \cdot d$

$\pi = 3.14159265$

A.3 Ultrasonic Pulse Velocity

3.1 Sidewalks

PULSE VELOCITY TEST - ASTM C597

MTO Concrete Cores - Sidewalk Cores

Core ID	Diameter (m)	Length (m)	Transit Time				Pulse Velocity V (m/s)	Average Pulse Velocity V (m/s)	
			T1 (µs)	T2 (µs)	T3 (µs)	Avg. T (µs)			
1.5.S	0.094	0.153	30.8	30.6	30.2	30.5	5021		
1.6.S	0.093	0.155	30.6	30.2	30.2	30.3	5103	5062	Mix 1
2.5.S	0.093	0.153	30.2	30.8	30.2	30.4	5033		
2.6.S	0.093	0.154	30.8	30.6	30.8	30.7	5004	5019	Mix 2
3.5.S	0.092	0.155	30.4	30.4	30.2	30.3	5110		
3.6.S	0.090	0.156	32.6	32.8	32.6	32.7	4769	4940	Mix 3
4.5.S	0.092	0.155	30.8	30.2	30.4	30.5	5097		
4.6.S	0.093	0.158	32.4	32.2	32.6	32.4	4877	4987	Mix 4
5.5.S	0.094	0.156	32.2	32.0	32.2	32.1	4855		
5.6.S	0.095	0.157	32.4	32.6	32.2	32.4	4846	4850	Mix 5
6.5.S	0.096	0.156	30.4	30.4	30.4	30.4	5125		
6.6.S	0.096	0.156	30.4	30.4	30.4	30.4	5115	5120	Mix 6

Pulse velocity $V = L/T$

3.2 Beams

PULSE VELOCITY TEST - ASTM C597

MTO Concrete Cores - Beam Cores

Core ID	Diameter (m)	Length (m)	Transit time			Avg. T (µs)	Pulse Velocity V (m/s)	Average Pulse Velocity V (m/s)	
			T1 (µs)	T2 (µs)	T3 (µs)				
1.1	0.096	0.151	30.2	30.4	30.2	30.3	4989		
1.2	0.096	0.155	30.2	30.2	30.4	30.3	5121		
1.3	0.096	0.135	26.8	26.4	26.6	26.6	5075		
1.5	0.096	0.185	36.6	36.6	36.8	36.7	5045	5058	Mix 1
2.1	0.096	0.152	30.8	30.8	32.0	31.2	4872		
2.2	0.096	0.156	32.2	32.0	32.0	32.1	4865		
2.3	0.096	0.113	22.6	22.4	22.4	22.5	5030		
2.5	0.096	0.206	42.0	42.4	42.2	42.2	4882	4912	Mix 2
3.1	0.096	0.153	30.8	30.6	30.4	30.6	5000		
3.2	0.096	0.153	30.8	32.0	32.0	31.6	4842		
3.3	0.096	0.144	28.2	28.2	30.0	28.8	5000		
3.5	0.096	0.228	46.4	46.6	46.2	46.4	4914	4939	Mix 3
4.1	0.096	0.150	30.6	30.4	30.6	30.5	4913		
4.2	0.096	0.148	28.6	28.4	28.4	28.5	5199		
4.3	0.096	0.148	28.6	30.0	28.6	29.1	5092		
4.5	0.096	0.221	44.4	44.8	44.6	44.6	4955	5040	Mix 4
5.1	0.096	0.156	32.4	32.4	32.2	32.3	4825		
5.2	0.096	0.151	30.2	30.0	30.0	30.1	5022		
5.3	0.096	0.131	26.6	26.6	26.4	26.5	4937		
5.5	0.096	0.225	44.8	44.6	44.6	44.7	5037	4955	Mix 5
6.2	0.096	0.134	26.4	26.4	26.6	26.5	5063		
6.3	0.096	0.138	28.6	28.0	28.2	28.3	4882		
6.5	0.096	0.216	44.4	42.8	44.2	43.8	4932	4959	Mix 6
6R.1	0.096	0.152	30.8	30.8	30.2	30.6	4967		
6R.2	0.096	0.153	30.4	30.8	30.2	30.5	5022		
6R.3	0.096	0.146	28.8	28.4	30.2	29.1	5011		
6R.5	0.096	0.215	42.6	42.8	44.2	43.2	4977	4994	Mix 6 with rebars

Pulse velocity $V = L/T$

A.4 ASTM C1202

4.1 RCPT Sidewalks

Top Specimens			Bottom Specimens		
Sample ID 1.1T	100<248<1000	very low	Sample ID 1.1B	100<299<1000	very low
Sample ID 1.2T	100<228<1000	very low	Sample ID 1.2B	100<403<1000	very low
Sample ID 2.1T	100<226<1000	very low	Sample ID 2.1B	100<659<1000	very low
Sample ID 2.2T	100<215<1000	very low	Sample ID 2.2B	100<477<1000	very low
Sample ID 3.1T	100<451<1000	very low	Sample ID 3.1B	1000<1219<2000	low
Sample ID 3.2T	100<423<1000	very low	Sample ID 3.2B	1000<1248<2000	low
Sample ID 4.1T	100<198<1000	very low	Sample ID 4.1B	100<291<1000	very low
Sample ID 4.2T	100<153<1000	very low	Sample ID 4.2B	100<312<1000	very low
Sample ID 5.1T	100<612<1000	very low	Sample ID 5.1B	1000<1502<2000	low
Sample ID 5.2T	100<667<1000	very low	Sample ID 5.2B	1000<1361<2000	low
Not Available			Not Available		
Sample ID 6.2T	100<876<1000	very low	Sample ID 6.2B	1000<1690<2000	low
Sample ID 6R.1T	1000<1051<2000	low	Sample ID 6R.1B	1000<1850<2000	low
Sample ID 6R.2T	100<655<1000	very low	Sample ID 6R.2B	2000<2112<4000	moderate

4.2 RCPT Beams

Specimen ID	Charge Passed Coulombs	Charge (Adjusted) Coulombs	Chloride Ion Penetrability
1.1.S	383	409	Very low
1.2.S	228	245	Very low
2.1.S	641	654	Very low
2.2.S	452	501	Very low
3.1.S	1055	1097	Low
3.2.S	816	851	Very low
4.1.S	209	212	Very low
4.2.S	198	201	Very low
5.1.S	1875	1901	Low
5.2.S	2137	2161	Moderate
6.1.S	1867	1826	Low
6.2.S	1545	1509	Low

5. Porosity by ASTM C642

MTO Cores

Density, Absorption, and Voids in Hardened Concrete ASTM C642

Sample ID	Oven Dry Mass A, g	Saturated Mass After Immersion B, g	Saturated Mass After Boiling C, g	Suspended Mass D, g	Absorption After Immersion %	Absorption After Immersion and Boiling %	Bulk Density Dry g ₁ /cm ³	Bulk Density After Immersion g/cm ³	Bulk Density After Immersion and Boiling g/cm ³	Apparent Density g ₂ /cm ³	Volume of Permeable Pore Space (Voids) %
1.4.S	1141.39	1198.73	1201.36	687.21	5.02	5.25	2.22	2.33	2.34	2.51	11.66
2.4.S	1117.80	1179.80	1183.62	680.84	5.55	5.89	2.22	2.35	2.35	2.56	13.09
3.4.S	1106.63	1168.25	1174.19	670.49	5.57	6.11	2.20	2.32	2.33	2.54	13.41
4.4.S	1130.34	1187.72	1191.06	682.31	5.08	5.37	2.22	2.33	2.34	2.52	11.94
5.4.S	1125.33	1189.48	1196.97	684.52	5.70	6.37	2.20	2.32	2.34	2.55	13.98
6.4.S	1183.29	1249.98	1257.16	717.11	5.64	6.24	2.19	2.31	2.33	2.54	13.68